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(54) A method and apparatus for the production of honeycombs for beekeeping

(57) The method comprises a first step of applying liquid wax to a mould formed by a plurality of projections conjugate with the cells of the honeycomb in a manner such that the filling of the spaces of the mould with molten wax is complemented by the formation of an upper plate interconnecting the various cells, then proceeding with the moulding of the half honeycomb and subsequent cooling to enable the half honeycomb to be removed from the mould. The apparatus has two parallel, endless belts separated by a space slightly larger than the height of a half honeycomb and driven in a manner such that the adjacent passes have the same speed and direction of movement, a mould constituted by a plurality of rows of silicone projections of a shape conjugate with the cells being fitted on one of the belts.

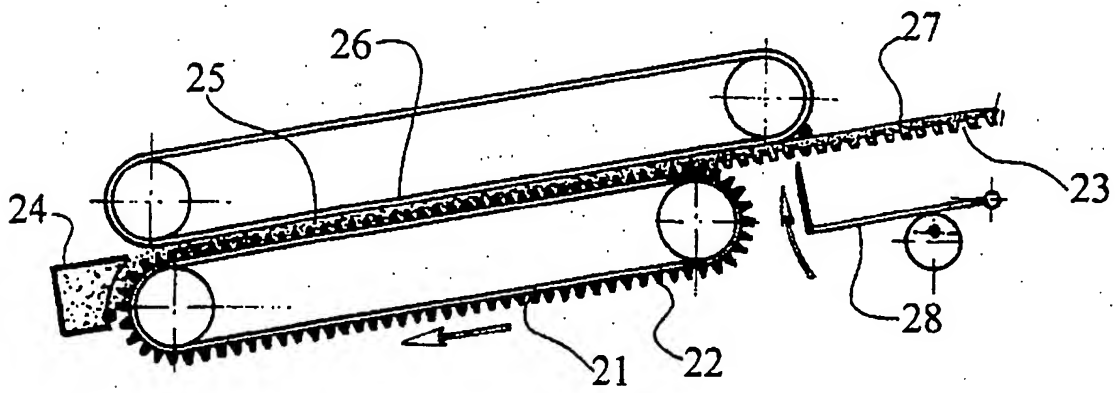

FIG. 10

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tion.

Figures 12 and 13 show respective details of the wax-supply region of the variant indicated.

Figures 14 and 15 show, in section, respective details of the cut portion of the element produced at the output of the process in the same variant as Figures 12 to 15.

According to the drawings, the half honeycombs are manufactured by two endless conveyor belts 1 and 2 mounted, respectively, on rollers 3, 4 and 5, 6, which are moved in a manner such that the inner runs 7 and 8 of the said belts move in the same direction and at the same speed. The space between the said runs 7 and 8 is slightly larger than the half honeycomb to be produced, which is indicated 9 in Figures 5 and 8. The said half honeycomb comprises a plurality of projections in the form of resilient cores 10 and a joining region or back plate 11 which connects them.

Preferably, the endless belts 1 and 2 are arranged at a small angle to the horizontal and the lower belt has a region or mould 12 provided with a plurality of rows of resilient cores 13, Figures 6 to 8, which are intended to form the cells of the half honeycombs to be produced. As the mould moves in front of a wax-supply vessel 14, the spaces between the cores 13 are filled, as can be seen in greater detail in Figure 7, in which it can be seen that the spaces between the cores 13 are filled with masses of wax 15 which also form the rear joining region or plate 11.

In order to improve the filling of the spaces between the cores 13, a mechanism is provided for opening out the spaces at the moment when they are filled; this mechanism may be a simple roller 16 which establishes contact with a region in the vicinity of the tip or end of the cores 13, enlarging the intermediate spaces and allowing a quantity of wax greater than the stable volume 15 shown to enter between every two cores; owing to the resilient action of the cores, this enables the surplus volume of wax to be expelled outwardly relative to the cores, enabling the connecting region or plate 11 to be formed correctly. A lower container 17 is intended to receive the surplus wax from the filling operation.

After the spaces between the cores have been filled, the movement of the endless belts arranged close together as shown in the drawings, permits the correct formation of the half honeycomb 9 which is the objective of the method. During its passage between the two endless belts, cooling of the half honeycomb takes place and leads to its solidification.

To improve the removal from the upper belt 1 of the half honeycomb produced when the end of the travel is reached, as can be seen in Figure 8, the present invention provides for the arrangement of a heat source 18 situated in the vicinity of the output of the half honeycomb produced, preferably on the inner side of the conveyor belt 1, the heat source being intended to bring about local softening or melting of the rear portion of the plate 11 of the half honeycomb to enable it to be detached more easily. To improve the said detachment, the present invention provides for the arrangement of a wire or thin bar 19, substantially touching the conveyor belt 1, facilitating the separation of the half honeycomb 9 from the upper belt 1.

For half honeycombs with very thin walls, the arrangement shown in Figure 9 may be advantageous; this diawing shows an auxiliary roller 20 which, together with the end roller 6 of the lower belt 2, enables a greater smoothness to be achieved in the separation of the half honeycomb from the upper belt.

Preferably, the endless belts 1 and 2 are steel-based belts and the moulds or groups of cores 13 are silicone-based in order to give them sufficient resilience and favourable mould-release characteristics.

The method provides for the addition of a certain quantity of water to the molten wax to ensure better adhesion of the half honeycomb to the upper belt, means being provided for replacing the water which is used up during the operation of the machine.

As will be understood, the method and apparatus of the present invention permits the production of half honeycombs, that is, elements such as that indicated 9 in Figure 8 such that, in order to produce the complete honeycomb, it will be necessary to use two of the said half honeycombs, joined by their bases, the various cores extending in opposite directions.

The present invention permits the production of half honeycombs the dimensions of which are variable according to the mould used. In this connection, it should be borne in mind that, for simplicity, the drawings do not show the half honeycomb 9 with the same dimensions as the mould or core region 12; however, this is only a convention of representation since, depending on the filling of the mould, the half honeycomb produced may have dimensions variable up to overall dimensions corresponding to the whole mould.

The variant of Figures 10 to 15 provides for the lower belt 21 to be formed in a manner such as to have, on its outer face and for its entire length, projections 22 of a shape conjugate with the cells 23 to be formed in the honeycombs so that the said projections 22 extend over the entire length of the belt 21 without a break and without any difference over its entire travel so that, after the supply of wax has been received from the supply vessel 24, a continuous mass of wax 25 is transported, held between the cell projections 22 of the belt 21 and the facing run of the upper belt 26, giving rise, at the output, to a continuous element 27 of indefinite length, the structure of which corresponds basically to that of the half honeycombs to be produced. In order to separate the individual half honeycombs from the linear element 27 as a whole, the machine has a cutting device 28 for cutting the element 21 into sections of the desired length. The said cutting device may be of any suitable type, there being shown schematically, purely by way of example, a cranked blade which is operated by an eccentric or the like and which may be graduated in order to

cells of the honeycomb is covered with the said rows of projections throughout its length without a break, receiving a continuous supply of wax and continuously moulding a linear element of indeterminate length, which is cut into sections at the output of the unit comprising the two belts.

14. Apparatus according to Claim 13, characterized in that the device for cutting the continuously moulded element is adjustable in order to vary the length of the half honeycombs produced.

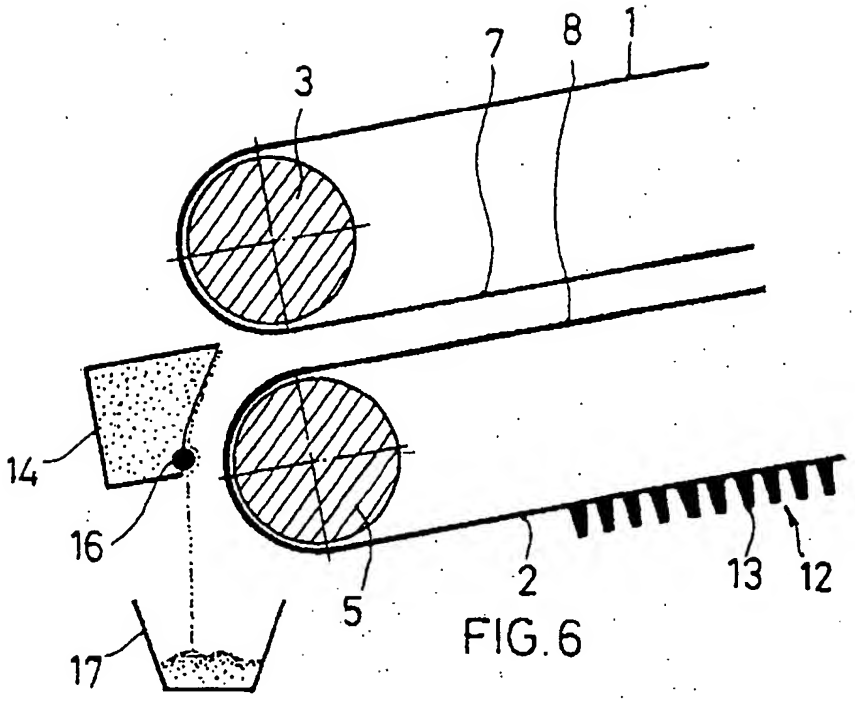

FIG. 6

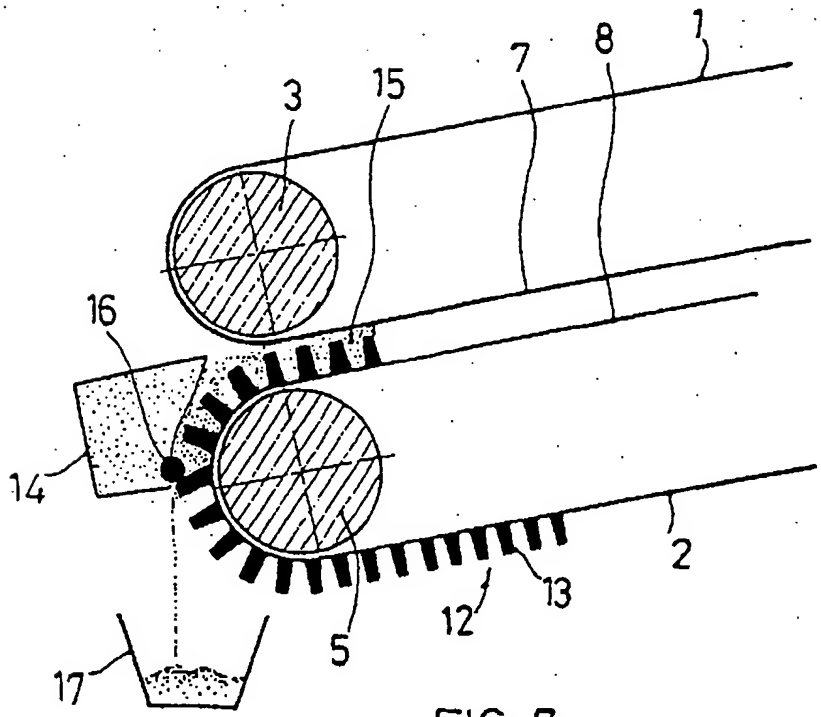

FIG. 7

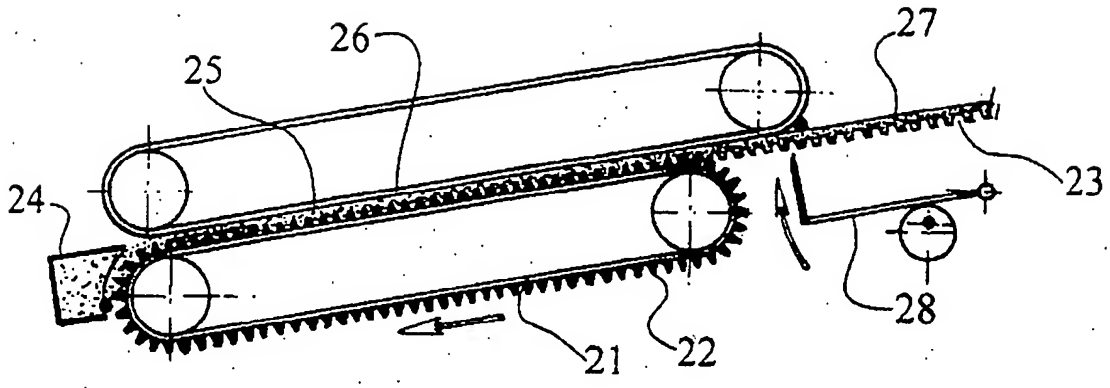

FIG. 10

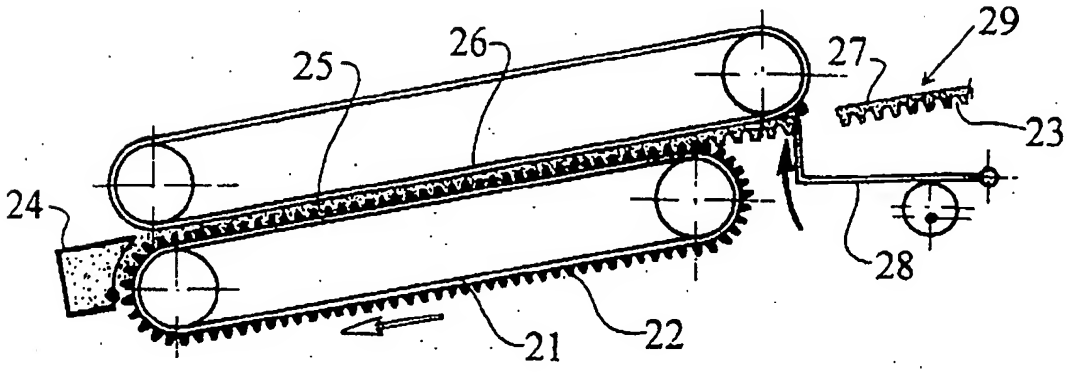

FIG. 11

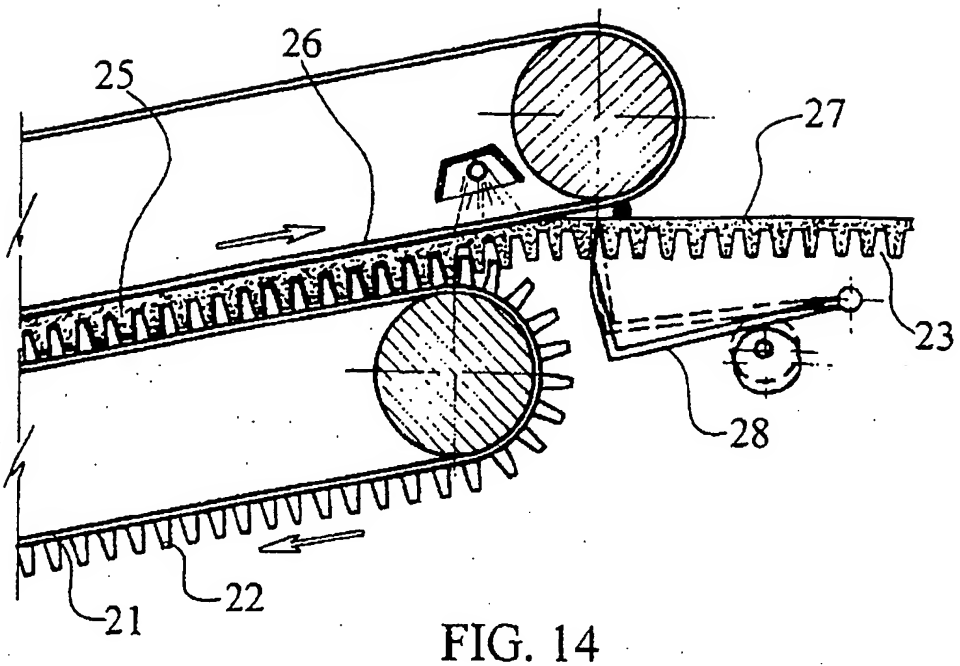

FIG. 14

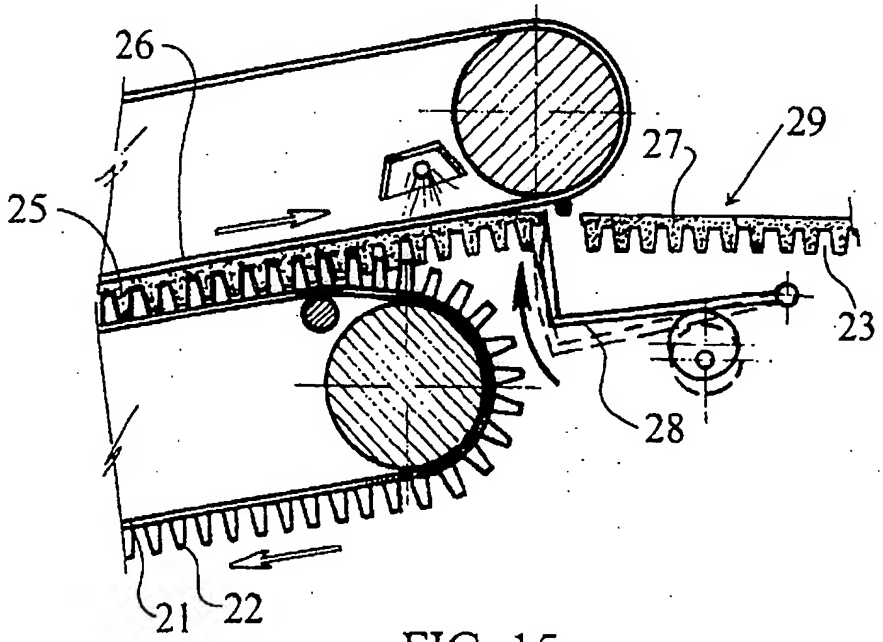

FIG. 15

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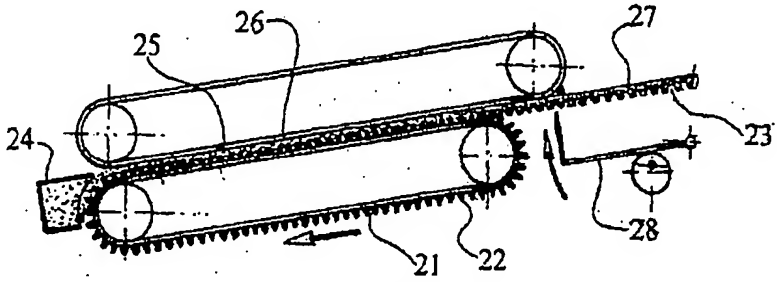

FIG. 10

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 98 50 0151

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2560746 A	13-09-1985	NONE	
FR 2448290 A	05-09-1980	NONE	
US 2561147 A	17-07-1951	NONE	
WO 9006219 A	14-06-1990	NL 8803036 A	02-07-1990
		AT 91951 T	15-08-1993
		CA 2004993 A	09-06-1990
		DE 68907920 T	11-11-1993
		EP 0447441 A	25-09-1991
		ES 2043355 T	16-12-1993
		JP 4502285 T	23-04-1992

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